

**REMARKS**

Claims 1 - 9 are pending in the present patent application. Applicant has amended claims 1- 9. Applicant respectfully requests reconsideration of pending claims 1- 9 in the present patent application in view of the following amendments and remarks.

**Examiner's Rejection of Claims 1 - 9 under 35 U.S.C. § 103(a)**

The Examiner has rejected independent claims 2, 4, and 6 under 35 U.S.C. § 103(a) as being unpatentable over Liu (U.S. Patent No. 5,680,508) in view of Fink et al. (U.S. Patent No. 5,933,801) stating:

Regarding claims 2, 4, and 6

Transforming input signal to a time-frequency representation is taught by Liu at Figure 1, element 19;

Liu does not specifically teach isolating transient sounds and including transients in the estimation of the background noise. However, refer to Fink et al. who teach a method of transforming a speech signal which separates a speech signal into two signal parts (which includes a transient portion) and suggest implementation of the method as being extremely expedient for synthesizing well-defined sounds (abstract).

Therefore, it would have been obvious to one of ordinary skill at the time of invention to modify the speech enhancement system of Liu to implement transient detection and estimation in conjunction with signal and background noise estimation, for the purpose of improving synthesis, as suggested by Fink et al.

Comparing time-frequency representation with a signal model is taught by Liu at Figure 5: col. 10 lines 16-23;

Determining a template in the signal model is taught by Liu at Figure 5: col. 10, lines 16-23;

Synthesizing a signal based on the best matching template is taught by Liu at Figure 2, element 25: col. 2, lines 1-2; col. 10, line 23.

Applicant respectfully disagrees and submits that claims 2, 4, and 6 are allowable for at least the following reasons:

The transient detector of the present invention is concerned with detecting the duration of transients. Depending upon the detected duration of transients, a transient will be deemed to be an instance of the sought signal or merely impulsive noise. The method of classifying the

transients exploits the pulsing nature of the human voice, characterized by glottal pulses appearing in the short-time spectrum.

Although Fink et al. incorporates a transient detector in its invention, it should be noted that the transient detector [15] of Fink et al. is really operating as a peak detector because it is only used to detect the peak amplitude levels of the transients. The invention of Fink et al. uses the detection of the transient peak amplitude levels to distinguish transients as being the sought signal or background noise. At column 3, lines 21-25, Fink et al. states, "Noise transients may be distinguished from the other signal elements by means of a simple level detector, as noise transients contain peak amplitudes ... which are much higher than those of the "speech sounds". The invention of Fink et al. operates such that depending upon the peak level of the transient that is detected, the transient detector may decide that the transient is a noise transient and will subsequently signal the multiplier to reduce its amplification of the noise. This is described in Fink et al. at column 6, lines 38-43, which reads, "...the transient detector is adapted such that on the basis of the amplitude of the noise pulse it detects said amplitude and signals the multiplier [27] to reduce its amplification, following which the same signal is passed via the delay circuit [26] to the multiplier which the amplification thereof is reduced..." Thus, it is evident that the invention of Fink et al. clearly does not incorporate the concept of transient detectors being used to detect various transient durations to classify the transients in conjunction with updating estimated background noise statistics.

Thus, Applicant submits that since Liu and Fink et. al., either alone, or in any combination, do not teach, describe, or suggest this particular element, the claims are now allowable.

The Examiner has rejected claims 1, 3, and 5 under 35 U.S.C. § 103 as being unpatentable over Liu (US Patent No. 5,680,508) in view of Miseki et al (US Patent No. 6,167,375) stating:

Regarding claims 1, 3, and 5  
Transforming input signal to a time-frequency representation is taught by Liu at Figure 1, element 19;  
Estimating background noise is taught by Liu at Figure 5: col. 10, lines 24-36;  
Comparing time-frequency representation with a signal model is taught by Liu at Figure 5: col. 10, lines 16-23;  
Determining a template in the signal model is taught by Liu at Figure 5: col. 10, lines 16-23;  
Replacing the acoustic input signal is taught by Liu at col. 10, lines 16-23.  
Liu does not specifically teach replacing the acoustic input signal with a low-noise output signal comprising a mix of the input signal and the best matching template. However, refer to Miseki et. al. who teaches a method for encoding and decoding into a speech component and a background noise component (isolating sounds) and a multiplexer multiplexes the data of the two components to produce a low-noise output signal (abstract), for the purpose of efficiently encoding and decoding a speech signal which includes background noise such that the compressed speech is as close to the original speech as possible (col. 1, lines 6-11).

Therefore, it would have been obvious to one of ordinary skill at the time of invention to modify the speech enhancement system of Liu to implement replacing the acoustic input signal with a low-noise output signal comprising a mix of the input signal and the best matching template, as suggested by Miseki et. al., for the purpose of efficiently encoding and decoding a speech signal which includes background noise such that the compressed speech is as close to the original speech as possible, as suggested by Miseki et. al.

Applicant contends that since these claims contain references to transient detectors detecting transient duration in conjunction with background noise estimation and as previously discussed, Liu and Miseki et al., either alone, or in conjunction, do not teach, describe, or suggest this element, the claims are now allowable.

The Examiner has rejected claims 7 and 9 under 35 U.S.C. § 103 as being unpatentable over Liu (US Patent No. 5,680,508) in view of Fink et al. (US Patent No. 5,933,801) and Miseki et al. (US Patent No. 6,167,375) stating:

Regarding claims 7-9  
Transforming input signal to a time-frequency representation is taught by Liu at Figure 1, element 19;  
Liu does not specifically teach isolating transient sounds and including transients in the estimation of the background noise. However, refer to Fink et. al. who teach a method of transforming a speech signal which

separates a speech signal into two signal parts (which includes a transient portion) and suggest implementation of the method as being extremely expedient for synthesizing well-defined sounds (abstract).

Therefore, it would have been obvious to one of ordinary skill at the time of invention to modify the speech enhancement system of Liu to implement transient detection and estimation in conjunction with signal and background noise estimation, for the purpose of improving synthesis, as suggested by Fink et. al.

Comparing time-frequency representation with a signal model is taught by Liu at Figure 5: col. 10, lines 16-23.

Determining a template in the signal mode is taught by Liu at col. 10, lines 16-23.

Liu does not specifically teach replacing the acoustic input signal with a low-noise output signal comprising a mixture of the input signal and the best matching template. However, refer to Miseki et. al. who teach a method for encoding and decoding a speech signal including background noise wherein an input signal is separated into a speech component and a background noise component (isolating sounds) and a multiplexer mutiplexes the data of the two components to produce a low-noise output signal (abstract), for the purpose of efficiently encoding and decoding a speech signal which includes background noise such that the compressed speech is as close to the original as possible (col. 1, lines 6-11).

Therefore, it would have been obvious to one of ordinary skill at the time of invention to modify the speech enhancement system of Liu to implement replacing the acoustic input signal with a low-noise output signal comprising a mix of the input signal and the best matching template, as suggested by Miseki et. al., for the purpose of efficiently encoding and decoding a speech signal which includes background noise such that the compressed speech is as close to the original speech as possible, as suggested by Miseki et. al.

Applicant contends that since these claims contain references to transient detectors detecting transient duration in conjunction with background noise estimation and as previously discussed, Liu, Fink et al., and Miseki et al., either alone, or in conjunction, do not teach, describe, or suggest this element, the claims are now allowable.

**CONCLUSION**

The examiner has rejected claims 1-9. Applicant has amended claims 1 - 9. For at least the foregoing reasons, Applicant submits that pending claims 1 - 9 are now in condition for allowance. Applicant therefore respectfully requests that pending claims 1 - 9 be allowed.

Respectfully submitted,

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